
GUIDANCE FOR THE PREPARATION OF CHAPTERS FOR THE HIGHWAY SAFETY MANUAL

It is critical to note that this document is a working document and that content may change – every effort will be made not to make changes to the sections titled Target Audience, and Chapter Content, Style, And Format Requirements. It is therefore the responsibility of the user of this document to ensure that use is made of the latest updated version of this document.

INTRODUCTION

This document provides guidance for the preparation of chapters of the Highway Safety Manual (HSM). It is recognized that the respective NCHRP Project Panels manage and guide the development of NCHRP related materials and this document is provided should the contractor and panel wish to consider suggestions from the Task Force.

It is recommended that all chapters that are prepared for the HSM conform to the technical and formatting requirements described in this document. The purpose is to create style and format consistency between authors with the goal of minimizing complications when the final document is assembled for production. This document briefly describes the HSM Task Force to contractors, the status of current work on the HSM, chapter content, style, and formatting requirements, terminology, and a summary of the technical review process.

Questions about this document or issues related to the preparation of chapters for the HSM can be directed to the chair of the Content Subcommittee: John Milton, at 360.705.7299 or miltonj@wsdot.wa.gov.

HSM TASK FORCE STRUCTURE

The Transportation Research Board (TRB) Task Force for the Preparation of a Highway Safety Manual ANB25T (HSM TF) oversees the preparation of the Highway Safety Manual. The Task Force has 6 subcommittees, each of which has various responsibilities. Details about each committee activities and chairs can be found on the public website for the HSM www.highwaysafetymanual.org. It is desirable that Chapter authors be aware of the TF structure and the responsibilities of each subcommittee.

STATUS OF CURRENT WORK

Various research projects are underway or proposed which will become major components, parts, and chapters of the HSM. Most of these are NCHRP led projects, but it is expected that authors outside of the normal NCHRP process will propose other state of the art efforts. This process for submittal for work outside of the NCHRP process is currently under development by the HSM Task Force.

Figure 1 shows the current HSM schedule and research projects related to the preparation of the First edition of the HSM. Any changes to this schedule will be available from the Chair of the HSM Task Force

TARGET AUDIENCE

The target audience consists of employees or consultants working for a transportation agency at state, county, MPO, or city level. Two distinct types of groups are identified for different parts of the HSM:

- a) Parts I, II, IV, and V would be written for understanding at the technician level, but would likely contain information of significant complexity. The target individuals would not necessarily be degreed and would have limited safety related experience and knowledge. The target audience consists of individuals in planning, design, operations, maintenance (RPDOM).
- b) Because of the more complex nature of Part III the target audience is a graduate engineer, those involved in the academic process or equivalent with a fundamental knowledge in data analysis, statistics and roadway safety.

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Figure 1: Diagram with schedule of NCHRP projects related to the HSM as of January 2005

| Activity | Product | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | Interim Report | Prototype Chapter | Preliminary Draft Chapter(s) | Final Draft Chapter(s) | Draft Materials | Final Materials | Preliminary Draft Chapter(s) | Final Draft HSM |
|-------------------------|--|------|------|------|------|------|------|------|------|----------------|-------------------|------------------------------|------------------------|-----------------|-----------------|------------------------------|-----------------|
| HSM PROJECTS | | | | | | | | | | | | | | | | | |
| NCHRP Project 17-18 (4) | Work Plan; Annals Outline; Prototype Chapter 8 | | | | | | | | | Complete | Complete | Complete | Complete | - | - | - | - |
| NCHRP Project 17-26 | Part III; Chapter 10 | | | | | | | | | Complete | - | 7/05 | 10/05 | - | - | - | - |
| NCHRP Project 17-29 | Part III; Chapter 9 | | | | | | | | | 3/05 | - | 5/06 | 8/06 | - | - | - | - |
| NCHRP Project 17-27 | Parts I and II; Chapter 2 through 7 | | | | | | | | | 2/05 | 6/05 | 2/06 | 5/06 | - | - | - | - |
| NCHRP Project 17-34 | Parts IV and V; Chapters 11 through 16 | | | | | | | | | 7/05 | 10/05 | 3/06 | 6/06 | - | - | - | - |
| Production | First Edition HSM | | | | | | | | | 8/06 | - | - | - | - | - | 6/07 | 9/07 |
| Training | Training Course for First Edition HSM | | | | | | | | | 6/07 | - | - | - | 12/07 | 3/08 | - | - |
| RELATED PROJECTS | | | | | | | | | | Complete | - | 4/05 | 7/05 | - | - | - | - |
| NCHRP Project 17-25 | | | | | | | | | | Complete | - | 3/05 | 6/05 | - | - | - | - |
| NCHRP Project 3-65 | | | | | | | | | | Complete | - | - | - | - | - | - | - |
| Other Related Projects | | | | | | | | | | | | | | | | | |

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CHAPTER CONTENT, STYLE, AND FORMAT REQUIREMENTS

The first edition of the HSM will consist of parts I to V:

- Part I: Introduction and Fundamentals,
- Part II: Knowledge,
- Part III: Predictive Methods,
- Part IV: Safety Management of a Roadway System, and
- Part V: Safety Evaluation.

The Task Force has passed a series of motions that all chapter structure and major headings should follow those that are contained in the draft annotated outline that was prepared under NCHRP Project 17-18(4). As such, authors should seek to follow the outline and headings as closely as possible.

Substantial discussion and debate has occurred regarding HSM content, style, and format, deviations from the document outline, content, and style are not recommended. Because multiple contracts related to the production of the HSM are under way or was recently completed, even minor changes will require significant modification throughout the HSM and result in a substantial increase in the effort necessary to assemble the final document for production. Should the NCHRP contractor to the HSM propose deviations from the adopted styling and format it is preferred that changes be made as part of the final HSM document assembly. Minor changes often require significant revisions to other parts and chapters of the HSM.

It is desired that the following process be followed for any changes to the HSM outline:

- a) For NCHRP Projects:
 - i. The suggested changes or new content material are documented along with motivation for these changes or a synthesis of knowledge respectively in a project quarterly report.
 - ii. NCHRP staff will provide a copy of the quarterly report, and section containing the suggested changes or synthesis of knowledge with new content proposed for a section of the HSM to the Chair of the HSM Task Force.
 - iii. The Task Force and subcommittees will review the recommendation on of the proposed changes and new content for adoption or rejection through a formal process of the HSM Task Force (as described in more detail below and Exhibit 1).
 - iv. The Task Force and subcommittees provide project panels with adopted recommendations on the proposed changes and/or new content as received by the HSM Task Force Chair.
 - v. The NCHRP project panels adopt Task Force recommendations if it finds them appropriate and guides the contractor accordingly.
- b) For projects not part of the NCHRP Project Cycle:
 - i. Present the suggested changes along with motivation for these changes to the Chair of the HSM Task Force.
 - ii. The Task Force and subcommittees will provide the Chair with recommendations on the proposed changes and/or new content as received by the HSM Task Force Chair.
 - a. If necessary, the Technical Review committee and applicable Chapter Committee will also review and provide comments to the Chair.
 - iii. Recommendations will be adopted or rejected through the formal process of the HSM Task Force (as described in more detail below and Exhibit 1).
 - iv. The researcher will be notified of the decision of Task Force via the Chair of the Task Force

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All chapters prepared for the HSM shall be prepared in Microsoft Word 2003 using the HSM template, and conform to the formatting of the 2003 Transit Capacity and Quality of Service Manual (TCRP Report 100) with the following exceptions:

- Providing Heading 2, Heading 3, and Heading 4 styles with numbering.
- Any related motions passed after 2004 midyear meeting.

The content subcommittee has prepared style templates for use by authors available on the public website and provided in Appendix B to E. It is desirable that the contractors use these document styles without any modifications. In addition, it is desirable that the chapter authors make all references to exhibits, chapters, headings, and references cross referenced in the text using the *cross referencing* Word function, and automate the generation of tables of contents, lists of exhibits, etc within Word.

A list of references are provided at the end of the HSM, using the TRB formatting of references (note that the formatting of reference to references in the text itself is different and described in Appendix B).

TERMINOLOGY

Terminology is an important part of the development of the HSM. As such, the use of words and phrases and their meanings may become of significant importance. Therefore, from time to time, the Task Force may consider specific terms and their use in the document as policy related elements. As of January 2005, the Task Force has formally adopted the following guidelines:

“The Task Force will encourage interchangeability in terms (specifically “accident” versus “crash”) except for formal variables and factors (including their use in both equations and in general text) and each formal variable and factor should have a consistent term”

It is intended that chapters are developed with a fully developed glossary of key words. These glossaries will form the basis of the overall HSM glossary. A working group under the chairmanship of John Zegeer has been formed with responsibility for oversight of the HSM glossary. This working group makes final recommendations to the HSM Task Force as it relates to needed words. The latest draft of the glossary will be available on the Task Force website.

John Zegeer can be contacted at (954) 735-1245 or jzegeer@kittelson.com.

TASK FORCE REVIEW PROCEDURE

The review procedure is shown in Exhibit 1.

The Research Subcommittee of the HSM TF manages the Technical Review process. This process may be updated as necessary and the latest version of the process will be available on the Task Force website. The subcommittee developed an initial procedure for having research evaluated:

- Non-NCHRP contracts (prior to first edition of HSM) - research subcommittee will review research as submitted by the researchers to the TF Chair for relevance to an NCHRP contract and if the work seems appropriate, the research subcommittee will forward it to the NCHRP contractor of the relevant part of chapter.
- Non-NCHRP contracts (after the first edition has been developed) - a website submittal and review procedure will be developed, and recommendations will be forwarded to the Task Force Chair by the research subcommittee for consideration by the whole TF for inclusion.

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NCHRP contract work - the subcommittee will discuss with NCHRP contact opportunities for the subcommittee and Scientific Review Group to review work at interim stages

Upon completion of the technical review process, the chapter content and text are adjusted where and when necessary, by the contractor, Content Sub-Committee, or in future contracts as appropriate.. The chapters are then submitted to the HSM TF for adoption through an official voting process. It is noted that material for inclusion in the HSM can be in the form of specific HSM related projects or in the form of material offered for approval. The HSM TF review process facilitates the review of both these project types and the same criteria are used to evaluate the appropriateness of the material for inclusion into the HSM.

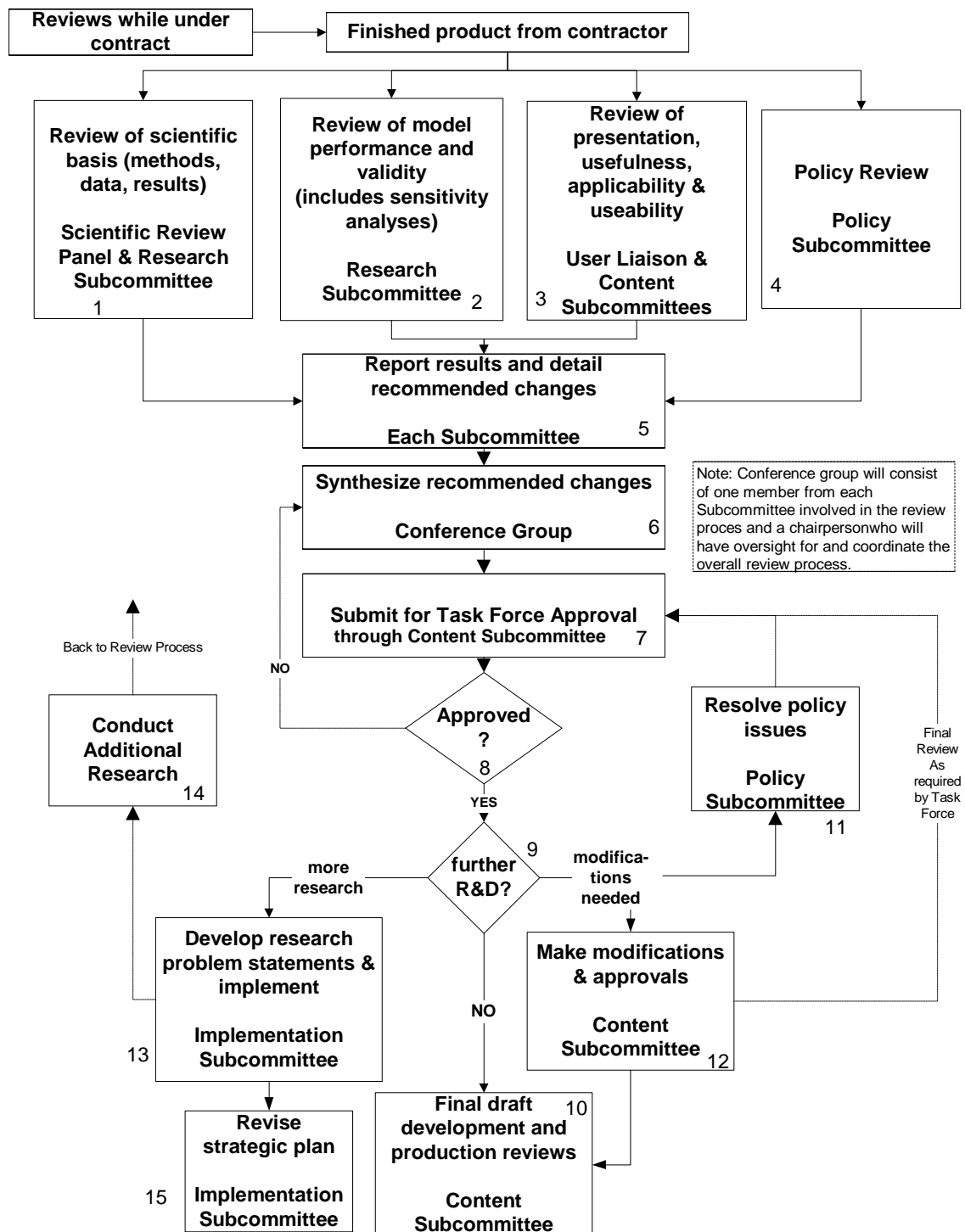
While a panel of selected professionals leads the NCHRP projects, input from the HSM Task Force is common and is normally expected. Any work contemplated to be part of the HSM undergoes a multiple review process. The various subcommittees of the HSM Task Force complete these reviews. These reviews focus on content, scientific validity, usability and consistency with policy and intent of the HSM. The subcommittees provide consultation and advice on acceptance or revision for inclusion in the HSM. This recommendation may lead to additional work or final adoption by the HSM Task Force. The following list provide specific responsibilities for the primary groups responsible for the HSM Task Force reviews.

- HSM Content Subcommittee - Responsible for the information presented and contained in the manual; works with all other subcommittees to incorporate changes that were consistent with the intent, purpose, format and use of the HSM; and makes final recommendation to the HSM Task Force for adoption of the Parts, Chapters and Sections of the HSM.
- HSM Technical Review Subcommittee - Responsible for the review of technical and scientific methods; also makes recommendations on the appropriateness of new material (see Appendix A for text of motion (5) passed in this regard).
- HSM Policy Subcommittee - Recommends approval of any information that presents policy changes in the HSM. During the development and review process the HSM TF actively seeks input from individuals in practice and formal structures; such as the AASHTO Standing Committee on Highway Traffic Safety, the AASHTO Subcommittee on Design and its Task Force on Geometric Design, other appropriate AASHTO groups, and the National Committee on Uniform Traffic Control Devices (see Appendix A for text of motion (6) passed in this regard).
- HSM User Liaison Subcommittee - Responsible for the information being presented in such a way that it is well presented and easy to use (usability) based on the needs of the user community. Recommends changes based on user feedback.

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Exhibit 1 – Framework for Reviewing Chapters Presenting Prediction Method



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Table 1 provides a summary of the evaluation criteria to be used by the TF to evaluate material presented for inclusion into the HSM.

Table 1: Evaluation Criteria for HSM content

| AREA | TASK FORCE SUBCOMMITTEE | EVALUATION CRITERIA |
|--|-------------------------------------|---|
| Content | Content | <ul style="list-style-type: none"> • Clarity of language and presentation to enable user to apply the HSM for the purpose for which it was developed: • To quantify safety in planning, design, operational, and maintenance related decision-making processes • Provide best available knowledge on safety. • Free of political or biased statements |
| Scientific Review | Research | <ul style="list-style-type: none"> • Soundness of model development process • Soundness of model • How well model is carried through to an application |
| Model performance and validity | User Liaison Content Research | <ul style="list-style-type: none"> • Detailed review of model implementation • Detailed review of results: • Validity of results: includes • Sensitivity analysis of model • Scenarios for which dependent variables are known <ul style="list-style-type: none"> ○ Accuracy ○ Precision ○ Stability |
| Presentation, Usefulness, Applicability, and Usability | User Liaison | <ul style="list-style-type: none"> • Presentation of methodologies of models: • User-friendliness • How readily applicable to needs of target users in terms of types of analysis • Usability within broader context of decisions made about road investments/improvements. |
| Policy review | Policy | <ul style="list-style-type: none"> • Language: liability • Conflicts with other established policy documents (national level policy documents only) |

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APPENDICES

APPENDIX A: Motions Passed

APPENDIX B to E: Format templates for the HSM

APPENDIX B: Format and styling for the chapter content of the HSM.

APPENDIX C: Glossary of Transit Capacity Manual (example of styling used for the HSM Glossary)

APPENDIX D: List of Symbols of Transit Capacity Manual (example of styling used for the HSM List of Symbols)

APPENDIX E: Index of Transit Capacity Manual (example of styling used for the HSM Index)

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APPENDIX A: Motions Passed

1. HSM TF motion passed on 10/02/02: "The JSC recommends that an HSM be developed and that TRB charge this joint subcommittee or its successor with planning, developing, and approving the HSM"
2. HSM TF motion passed on 10/02/02: "The JSC adopts the five-part structure, for the first edition of the HSM; Parts I-V, as it appears in the 26 September 2002 draft annotated outline that was submitted by BMI, under NCHRP Project 17-18(4)."
3. HSM TF motion passed on 10/02/02: "The JSC adopts the chapter structure, for the first edition of the HSM, as it appears in the 26 September 2002 draft annotated outline that was submitted by BMI, under NCHRP Project 17-18(4)."
4. HSM TF motion passed on 10/02/02: "The JSC adopts the major heading structure, for the first edition of the HSM, as it appears in the 26 September 2002 draft annotated outline that was submitted by BMI, under NCHRP Project 17-18(4), with the exception of Chapter 7 of the revised annotated outline"
5. HSM TF motion passed on 10/02/02: "Establish a Scientific Review Group the task of which is to review all material considered for inclusion into the HSM from the scientific point of view and to make recommendations to the JSC."
6. HSM TF motion passed on 10/02/02: "The Joint Subcommittee should, in the near future, initiate liaison with the AASHTO Standing Committee on Highway Traffic Safety, the AASHTO Subcommittee on Design and its Task Force on Geometric Design, other appropriate AASHTO groups, and the National Committee on Uniform Traffic Control Devices. The Joint Subcommittee should assure that these groups are regularly informed of the plans for HSM development as they evolve and should seek their input. When drafts of HSM materials are available, the Joint Subcommittee should offer these groups an opportunity to review and comment on the drafts and, in preparing the final HSM for publication, the Joint Subcommittee should consider any comments received from these groups."
7. HSM TF motion passed on 06/04/03: "The Task Force adopts the format and production standards used for the Highway Capacity Manual 2000 Edition for the Highway Safety Manual First Edition, and the current TRB Style Manual is adopted as the style guide for the Highway Safety Manual First Edition"
8. HSM TF motion passed on 6/30/2004: "The Task Force will encourage interchangeability in terms (specifically "accident" versus "crash") except for formal variables and factors (including their use in both equations and in general text) and each formal variable and factor should have a consistent term".

APPENDIX B: Format and styling for the chapter content of the HSM

PART I

[Part number is Heading 1: automatically numbered]

THIS IS THE PART TITLE

[Part Title: Tahoma, 12 pt, bold, justified, 4 pt spacing after]

CONTENTS

[Contents title is Front Matter Title: Tahoma, 12 pt, bold, centered, 36 pt spacing before, 12 pt spacing after]

CHAPTER 1. THIS IS HEADING 2.....I-1

- 1.1. This is Heading 3, Tahoma 10 pt bold, all caps, justified, 12 pt spacing before, 4 pt spacing afterI-1
 - 1.1.1. This is Heading 4, Tahoma 10 pt bold, justified, 12 pt spacing before, 3 pt spacing afterI-1

LIST OF EXHIBITS

[List of Exhibits or Equations is Front Matter 2: Tahoma, 12 pt, bold, centered, 36 pt spacing before, 12 pt spacing after]

Exhibit 1-1: This exhibit caption is in the right margin because this is an odd page. It is right justified (Exhibit Caption L)I-2

Exhibit 1-2: This exhibit caption is in the left margin because this is an even page. It is left justified (Exhibit Caption L)I-2

LIST OF EQUATIONS

Equation 1-1: Sample equation and caption [Equation Caption L] with reference ⁽¹⁾ .I-2

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CHAPTER 1.THIS IS HEADING 2

Heading 2: Tahoma, 12 pt bold, all caps, centered, page break before, 24 pt spacing after. It is recommended that all Parts and Chapters start on an odd page (i.e. on the right hand page of the document).

Check Page Setup: mirror pages; top, inside and bottom margins are 1", outside = 2.5". Layout: headers and footers are different odd and even. The margin lines are 0.88" below page, and 2.375" to the right of page edge on even pages or 6.125" to the right of page edge on odd pages.

Page numbering: it is recommended that the part number and page number be combined as follows Page "Part Number" – "Page Number" (e.g., Page I-3 for Part I, page 3), and that pages containing the table of contents include the Part number but that numbering be done in roman numerals (e.g., Page I-ix). This can be accomplished by inserting a Section Break after the Contents and Lists of Exhibits/Equations.

This is an example of the Normal font style; it is the format for most of the body of text. It is Book Antiqua, 9.5 pt font, English (U.S.), justified alignment, 0" left indentation, first line 0.25" indentation, right 0" indentation, single line spacing with paragraph spacing of 0 pt before and 4 pt after.

This document template contains all the styles proposed for use in the HSM 1st edition, based on the Transit Capacity and Quality of Service Manual, with some modifications. Additional styles may be required for web publishing (consultation with the HSM Task Force: Content Subcommittee would be desirable in this case). This document provides guidance for paper/PDF versions. Style documents are available for the Glossary, Index, and List of Symbols.

1.1. THIS IS HEADING 3, TAHOMA 10 PT BOLD, ALL CAPS, JUSTIFIED, 12 PT SPACING BEFORE, 4 PT SPACING AFTER

1.1.1. This is Heading 4, Tahoma 10 pt bold, justified, 12 pt spacing before, 3 pt spacing after

1.1.1. This is Heading 5, Tahoma 10 pt italic, justified, 12 pt spacing before, 3 pt spacing after; Heading 5 does not appear in the Contents list

All tables, figures, illustrations, photos, and exhibits will be captioned with the term "Exhibit" and numbered using the Chapter number [Heading 2 style]. Captions are placed in the margins, either left or right depending on the page (even or odd) and generally have no punctuation at the end.

Tables should follow the Exhibit 1-1 example for border style and text style: 2 ¼ pt border lines top and bottom, with 1 pt border in between columns or rows as needed. No border on left and right edges. Text within tables are formatted using the "Table Text" style and bold is applied to table headings. Where a table are split between pages, use Table > Heading Rows Repeat to allow the display of the table headings on the subsequent page as well.

A line break (or hard return) is recommended prior to and following any exhibit or equation.

This is a Margin Note R.

Exhibit 1-1: This exhibit caption is in the right margin because this is an odd page. It is right justified (Exhibit Caption L)

| Table Heading | Table Heading | Table Heading | Table Heading |
|---------------|---------------|-------------------|---------------|
| Table Text | Table Text | Table Text bullet | Table Text |
| Table Text | Table Text | Table Text | Table Text |
| Table Text | Table Text | Table Text | Table Text |

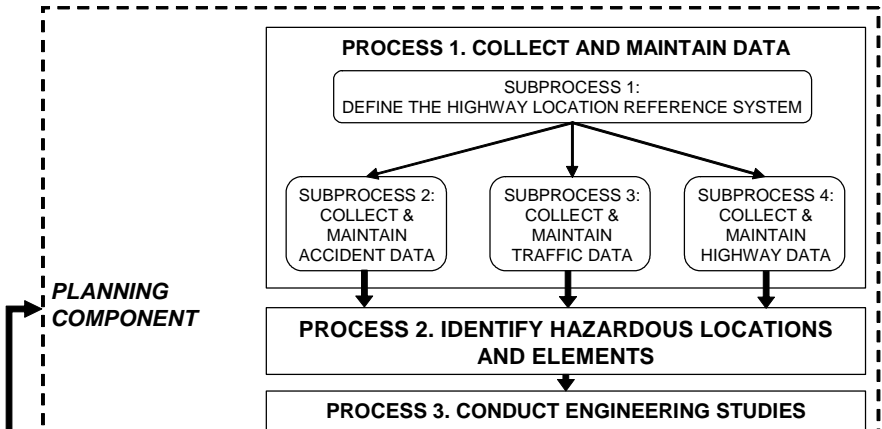
NOTE: If notes are required for exhibits, they are placed directly after the exhibit, flush with the left margin, with a tab to 0.38" after the initial word "NOTE:" [This is Exhibit Note: 7 pt Tahoma, left alignment, single spaced, 18 pt spacing after, hanging indent of 0.38"]

Cross-referencing to captions can be done using Insert>Reference>Cross-reference, select Reference Type: "Exhibit" (or "Equation"), and Insert Reference To: "only label and number". Cross-referencing to other chapters or parts would be beneficial and can be done using Insert>Reference>Cross-reference, select Reference Type: Heading, and Insert Reference To: "Heading Number". Cross-references do not require any special formatting, the Normal style is sufficient.

For Section 508 compliance and compliance to materials developed for federal government, the contractor is kindly requested to provide a text description for each exhibit – this can be added by adding alternative text under Format Picture> Web> Alternative Text. Right click on Exhibit 1-2 for an example.

It is suggested that the contractor use the TCM and HCM as an example for other aspects related to the use of illustrations, photos, and other exhibits in the document. Exhibit 1-2 is a sample figure with caption.

Exhibit 1-2: This exhibit caption is in the left margin because this is an even page. It is left justified (Exhibit Caption L)



NOTE: This is another example of Exhibit Note.

Equation font is 9 pt, Arial, italic, centered on the page. An equation caption is applied to equations or formulas. The equation style is applied to the variables of the equation when they are defined following the equation. A line break prior to an equation and following the variable definitions is recommended to improve readability. The preferred format is shown with Equation 1-1Error! Reference source not found..

$$E = mc^2$$

where:
 E = energy (J);
 m = mass (kg); and
 c = speed of light (m/s).

Equation 1-1: Sample equation and caption [Equation Caption L] with reference (Error! Reference source not found.)

Note the tabs and punctuation of the above variable definitions for Equation 1-1. The following paragraph is a bulleted list, note the punctuation:

- This is a full sentence list bullet [full sentences or paragraphs are punctuated with a period, do not mix punctuation within the same list].
- List bullet [short phrases are punctuated with a semi-colon];
 - List bullet indent [need to apply “List bullet indent” style to second level];
 - List bullet indent 2 [need to apply “List bullet indent 2” style to third level]; and,
- List bullet.

It is recommended that the use of second and third level bullets be limited or avoided if possible.

The following is a numbered list, note the punctuation:

1. This is a full sentence list number. [full sentences or paragraphs are punctuated with a period, do not mix punctuation within the same list]
2. List number; [short phrases are punctuated with a semi-colon];
 - a) List number indented once;
 - i) List number indented twice.

The use of numbered lists is particularly helpful when describing steps in a process (refer to the TCM for an example: p. 3-77, in the section named “Steps”).

If certain words require extra punch, there are two styles that may be applied to the font: **strong (bold)** or *emphasis (italics)*. Strong and emphasis can be applied on top of any other style.

Margin notes (left or right) can be used to highlight important points.

If another author is directly quoted within the text, “*it may look like this (emphasis with the related reference number)*” (Error! Reference source not found.).

“If another author is quoted for more than two lines it may look like this [Quote]. This style is Book Antiqua, 9.5 pt, indented 0.5” from the left margin, and justified to look like this.” (Error! Reference source not found.)

While it is recognized that direct quotations or reference to specific authors as part of the text, such as “... Smith et al., 2003, stated that ...” may be necessary, it is recommended that the writing style of the HCM and TCM be followed, i.e., this be limited.

Similar to the HCM, references are indicated by a number in brackets, but are superscript and italic like this (Error! Reference source not found.). Each Chapter has its own reference list. The reference number should be linked to the reference number using Insert>Reference>Cross-reference and selecting Reference Type: Numbered Item. Then Insert reference to: Paragraph number and select the reference of choice. Reference numbers and the brackets surrounding them can be formatted using the Reference Number style.

Footnotes are acceptable¹. See the bottom of this page for formatting. Endnotes are not recommended.

¹ This is Footnote Text. Book Antiqua, 8 pt.

This is a Margin Note R.

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**APPENDIX C: Glossary of Transit Capacity Manual (example of
styling used for the HSM Glossary)**

PART 8 GLOSSARY

This part of the manual presents definitions for the various transit terms discussed and referenced in the manual. Other important terms related to transit planning and operations are included so that this glossary can serve as a readily accessible and easily updated resource for transit applications beyond the evaluation of transit capacity and quality of service. As a result, this glossary includes local definitions and local terminology, even when these may be inconsistent with formal usage in the manual.

Many systems have their own specific, historically derived, terminology: a motorman and guard on one system can be an operator and conductor on another. Modal definitions can be confusing. What is clearly light rail by definition may be termed streetcar, semi-metro, or rapid transit in a specific city. It is recommended that in these cases local usage should prevail.

A **AADT** — annual average daily traffic; see *traffic, annual average daily*.
AAR — Association of American Railroads; see *organizations, Association of American Railroads*.
AASHTO — American Association of State Highway and Transportation Officials; see *organizations, American Association of State Highway and Transportation Officials*.
AAWDT — annual average weekday traffic; see *traffic, annual average weekday*.
ABS — automatic block signal; see *control system, automatic block signal*.
AC — alternating current.
ADA — Americans with Disabilities Act of 1990; see *legislation, Americans with Disabilities Act of 1990*.
ADB — advanced design bus; see *bus, advanced design and ATTB*.
ADT — average daily traffic; see *traffic, average daily*.
ATTB — Advanced Technology Transit Bus.
AFC — automatic fare collection; see *fare collection system, automatic*.
AGT — automated guideway transit; automated guided transit; see *transit system, automated guideway*.
ALRT — advanced light rail transit, see *transit system, light rail*.
APC — automatic passenger counter.
APM — automated people-mover, see *people-mover*.
APTA — American Public Transportation Association; see *organizations, American Public Transportation Association*.
APTS — Advanced Public Transportation Systems.
ATC system — automatic train control system.
ATIS — Advanced Traveler Information Systems.
ATO — automatic train operation.

ATP — automatic train protection.
ATS — automatic train supervision; automatic train stop system.
ATU — Amalgamated Transit Union; see *union, transit*.
AVL — automatic vehicle location system.
AW0, AW1, AW2, AW3 — see *car, weight designations*.
absolute block — see *block, absolute*.
absolute permissive block — see *block, absolute permissive*.
acceleration — increase in velocity per unit time; in transit, usually measured in feet per second squared (meters per second squared) or, in the United States, sometimes in miles per hour per second.
access, limited (controlled access) — in transportation, to have entry and exit limited to predetermined points, as with rail rapid transit or freeways.
accessibility — **1.** A measure of the ability or ease of all people to travel among various origins and destinations. **2.** In transportation modeling and planning, the sum of the travel times from one zone to all other zones in a region, weighted by the relative attractiveness of the destination zones involved. **3.** In traffic assignment, a measure of the relative access of an area or zone to population, employment opportunities, community services, and utilities.
accessibility, persons with disabilities (full accessibility) — the extent to which facilities are free of barriers and usable by persons with disabilities, including wheelchair users.
accessibility, station — a measure of the ability of all people within a defined area to get to a specific transit station.
accessibility, transit — **1.** A measure of the availability to all people of travel to and from various origins and destinations by transit. **2.** A measure of the ability of all people to get to and from the nearest transit stop or station and their actual origin or destination. **3.** In

AADT—accessibility, transit

APPENDIX D: List of Symbols of Transit Capacity Manual (example of styling used for the HSM List of Symbols)

LIST OF SYMBOLS

This portion of the glossary lists all of the symbols used in equations in the *Transit Capacity and Quality of Service Manual* and their units. The symbol descriptions given below may be abridged versions of the descriptions given in the text, particularly where a symbol is used in multiple equations.

| | |
|--------------|--|
| a |initial service acceleration rate, ft/s ² or m/s ² |
| a_g |acceleration due to gravity, ft/s ² or m/s ² |
| A_d |number of disembarking autos, AEU's |
| A_e |number of embarking autos, AEU's |
| B |bus facility vehicle capacity, bus/h |
| b |separation safety factor – surrogate for blocks |
| B_l |loading area bus capacity, bus/h |
| B_p |maximum bus capacity of critical bus stop in pattern, bus/h |
| B_s |bus stop vehicle capacity, bus/h |
| $B_{s,min}$ |minimum bus stop capacity along a bus facility, bus/h |
| $B_{1..B_n}$ |vehicle capacities of a set of routes in a skip-stop pattern, bus/h |
| c |capacity of a lane, veh/h |
| c_r |right-turn capacity, veh/h |
| c_v |coefficient of variation of dwell times |
| c_v |coefficient of variation of embarking and disembarking times |
| c_{vh} |coefficient of variation of headways |
| C |cycle length, s |
| C_c |car capacity, peak 15 minutes, p/car |
| C_c |carrier capacity, p/carrier |
| C_d |disembarking capacity at the constraining point, p/min |
| C_e |embarking capacity at the constraining point, p/min |
| C_g |gangway capacity, p/min/channel |
| C_h |cars operated per hour, car/h |
| C_{max} |longest cycle length in line's on-street section, s |
| C_w |capacity of the waiting area exit, p/min/channel |
| C_x |capacity of the walkway exit, p/min/channel |
| d |service deceleration rate, ft/s ² or m/s ² |
| d_1 |distance for one-block stop pattern, ft or m |
| d_2 |distance for multiple-block stop pattern, ft or m |
| d_c |average carrier/train/car spacing on the line, ft/carrier or m/carrier |
| d_{eb} |distance from front of stopped train to start of station exit block, ft or m |
| d_{ec} |pedestrian crossing delay exceeding 30 s, s |
| d_p |average pedestrian delay, s |
| d_s |deceleration rate, ft/s ² or m/s ² |
| d_{ts} |track separation, ft or m |
| d_x |distance from cross-over to platform, ft or m |
| D |pedestrian density, p/ft ² or p/m ² |
| D_n |number of doorways |
| D_w |doorway width, ft or m |
| f |bus (vessel) frequency, bus/h or vessels/h |
| f_a |arrival type adjustment factor for the ability to fully utilize the bus stops in a skip-stop operation |
| f_b |bus-bus interference adjustment factor |
| f_{br} |braking safety factor |
| f_{eff} |effective frequency, bus/h |
| f_g |grade factor |

**APPENDIX E: Index of Transit Capacity Manual (example of styling
used for the HSM Index)**

PART 9 INDEX

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